Maximal power output typically occurs when subjects perform ballistic exercises using loads of ~30% of one-repetition maximum (1-RM). However, performing 1-RM testing prior to power measurement requires considerable time, especially when testing involves multiple exercises. Maximal isometric force (MIF) is an attractive alternative strength measure for determining the optimal load based on MIF for maximizing dynamic power output during ballistic leg presses and bench presses. Therefore, substantial research has sought to determine the optimal load with which to perform maximal power testing. The purpose of this study was to determine the optimal load based on MIF for maximizing dynamic power output during ballistic leg presses and bench presses.

**Methods**

**Experimental Design.** Subjects performed isometric leg presses and bench presses, during which MIF was measured using force plates. Subjects subsequently performed ballistic, concentric-only leg presses and bench presses using loads corresponding to 20%, 30%, 40%, 50%, and 60% of MIF, respectively. A trend (p = 0.07) for a main effect of load; subsequent analysis indicated that power output during the 40% MIF attempt tended to be greater than power output during the 60% MIF attempt. (Figure 1)

**Conclusions**

Maximal isometric force (MIF), which requires little time and is inherently safe to perform, can be used as an alternative strength measure for determining the optimal load for power testing.

Loads of 40% and 30% of MIF elicit maximal power output during ballistic, concentric-only leg presses and bench presses, respectively. The optimal relative load for measuring peak power output (i.e., ~30%-40% MIF) is similar to that which is recommended when loading is based on 1-RM (i.e., ~30%-1-RM) (1).

References